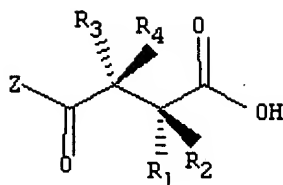


## CLAIMS

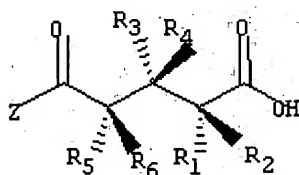
This listing of claims will replace all prior versions, and listings of claims in the application.

1. (Currently Amended) A method for inhibiting osteoclast formation in a subject in need thereof, comprising the step of administering a pharmaceutically effective amount of a an isolated compound of the general formula  $\text{ZOC}-(\text{CRR})_m\text{-COOH}$ , wherein:  $m = 2, 3$  or  $4$ ;  $Z$  is  $\text{OH}$  or  $\text{NH}_2$ ; one  $R$  in the compound is from the group consisting of  $\text{SO}_3\text{H}$ ,  $\text{OSO}_3\text{H}$ ,  $\text{CH}_2\text{-SO}_3\text{H}$ ,  $\text{CH}_2\text{-OSO}_3\text{H}$ , and  $\text{NHSO}_3\text{H}$ , and the remaining  $R$ s are  $\text{H}$  or  $\text{NH}_2$ , optionally with an additive, excipient, diluent or carrier.
2. (Original) The method according to claim 1, for inhibiting formation of mononuclear TRAP-positive osteoclasts.
3. (Original) The method according to claim 1, for inhibiting formation of multinuclear TRAP-positive osteoclasts.
4. (Original) The method according to claim 1, wherein the pharmaceutically effective amount is  $5$  to  $10$   $\text{mg/kg}$  of body weight.
5. (Original) The method according to claim 1, comprising administering the compound for between  $5$  and  $30$  days.
6. (Original) The method according to claim 1, comprising administering the compound for at least  $30$  days.
7. (Original) The method according to claim 1, comprising administering the compound for at least  $60$  days.
8. (Original) The method according to claim 1, comprising administering the compound for at least  $90$  days.
9. (Original) The method according to claim 1, wherein the compound has the structure shown below and the formula  $\text{ZOC-CR}_3\text{R}_4\text{-CR}_1\text{R}_2\text{-COOH}$ , wherein one of  $R_1$  to  $R_4$  is selected from the group consisting of  $\text{SO}_3\text{H}$ ,  $\text{OSO}_3\text{H}$ ,  $\text{CH}_2\text{-SO}_3\text{H}$ ,  $\text{CH}_2\text{-OSO}_3\text{H}$ , and  $\text{NHSO}_3\text{H}$ , and the remaining are  $\text{H}$  or  $\text{NH}_2$ .



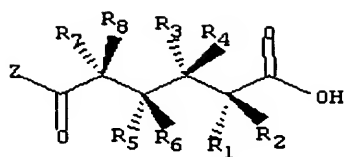
Structure 1

10. (Withdrawn) The method according to claim 1, wherein the compound has the structure shown below and the formula  $ZOC-CR_5R_6-CR_3R_4-CR_1R_2-COOH$ , wherein one of  $R_1$  to  $R_6$  is selected from the group consisting of  $SO_3H$ ,  $OSO_3H$ ,  $CH_2-SO_3H$ ,  $CH_2-OSO_3H$ , and  $NHSO_3H$ , and the remaining are H or  $NH_2$ .



Structure 2

11. (Withdrawn) The method according to claim 1, wherein the compound has the structure shown below and the formula  $ZOC-CR_7R_8-CR_5R_6-CR_3R_4-CR_1R_2-COOH$ , wherein one of  $R_1$  to  $R_8$  is selected from the group consisting of  $SO_3H$ ,  $OSO_3H$ ,  $CH_2-SO_3H$ ,  $CH_2-OSO_3H$ , and  $NHSO_3H$ , and the remaining are H or  $NH_2$ .



structure 3

12. (Original) The method according to claim 9, wherein the compound is selected from the group consisting of:
1. L- Aspartic acid, N-Sulfonic acid,
  2. L-Aspartic acid, 2 $\beta$ -sulfonic acid,
  3. L-Aspartic acid, 2 $\beta$ -sulfate,
  4. L-aspartic acid, 3 $\alpha$  -sulfonic acid,
  5. L-aspartic acid, 3 $\alpha$ -sulfate,
  6. L-aspartic acid, 3 $\beta$ -sulfonic acid,
  7. L-aspartic acid, 3 $\beta$ -sulfate,
  8. 2 $\alpha$ , 3-dicarboxy, propane-1-sulfonic acid,
  9. 2 $\alpha$ ,3-dicarboxy, propane-1-sulfate,
  10. 1 $\alpha$ ,2-carboxy ethane sulfonic acid,
  11. 1 $\alpha$ ,2-carboxy ethane sulfate,
  12. D-aspartic acid, N-sulfonic acid,
  13. 2 $\beta$ ,3-carboxy,propane-1-sulfonic acid,
  14. 2 $\beta$ ,3-carboxy,propane-1-sulfate,
  15. 1 $\beta$ ,2-carboxy ethane-1-sulfonic acid,
  16. 1 $\beta$ ,2-carboxy ethane-1-sulfate,
  17. D-aspartic acid, 2 $\alpha$ -sulfonic acid,
  18. D-aspartic acid, 2 $\alpha$  -sulfonic acid,
  19. D-Aspartic acid, 3 $\alpha$  -sulfonic acid,
  20. D-Aspartic acid, 3 $\alpha$ -sulfate,
  21. D-Aspartic acid, 3 $\beta$ -sulfonic acid,
  22. D-aspartic acid, 3 $\beta$ -sulfate,

23. L-asparagine, N-sulfonic acid,
  24. 2 $\alpha$ -carboxy, 3-carboxamido, propane-1-sulfonic acid,
  25. 2 $\alpha$ -carboxy, 3-carboxamido, propane-1-sulfate,
  26. 1 $\alpha$ -carboxy, 2-carboxamido, ethane sulfonic acid,
  27. 1 $\alpha$ -carboxy, 2-carboxamido, ethane sulfate,
  28. L-asparagine, 2 $\beta$ -sulfonic acid,
  29. L-asparagine, 2 $\beta$ -sulfate,
  30. L-asparagine, 3 $\alpha$ -sulfonic acid,
  31. L-asparagine, 3 $\alpha$ -sulfate,
  32. L-asparagine, 3 $\beta$ -sulfonic acid,
  33. L-asparagine, 3 $\beta$ -sulfate,
  34. D-asparagine, N-sulfonic acid,
  35. 2 $\beta$ -carboxy, 3-carboxamido, propane-1-sulfonic acid,
  36. 2 $\beta$ -carboxy, 3-carboxamido, propane-1-sulfate,
  37. 1 $\beta$ -carboxy, 2-carboxamido, ethane sulfonic acid,
  38. 1 $\beta$ -carboxy, 2-carboxamido, ethane sulfate,
  39. D-asparagine, 2 $\alpha$ -sulfonic acid,
  40. D-asparagine, 2 $\alpha$ -sulfate,
  41. D-asparagine, 3 $\alpha$ -sulfonic acid,
  42. D-asparagine, 3 $\alpha$ -sulfate,
  43. D-asparagine, 3 $\beta$ -sulfonic acid,
  44. D-asparagine, 3 $\beta$ -sulfate.
13. (Withdrawn) The method according to claim 10, wherein the compound is selected from the group consisting of:
- (I) L-glutamic acid, N-sulfonic acid,
  - (II) 2 $\alpha$ , 4-dicarboxy, butane-1-sulfonic acid,
  - (III) 2 $\alpha$ , 4-dicarboxy, butane-1-sulfate,
  - (IV) 1 $\alpha$ , 3-dicarboxy, propane sulfonic acid,
  - (V) 1 $\alpha$ , 3-dicarboxy, propane sulfate,
  - (VI) 1 $\beta$ , 3-dicarboxy, propane sulfate,

- (VII) 1 $\beta$ , 3-dicarboxy, propane sulfonic acid,
- (VIII) L-glutamic acid, 2 $\beta$ -sulfonic acid,
- (IX) L-glutamic acid, 2 $\beta$ -sulfate,
- (X) L-glutamic acid, 3 $\alpha$ -sulfonic acid,
- (XI) L-glutamic acid, 3 $\alpha$ -sulfate,
- (XII) L-glutamic acid, 3 $\beta$ -sulfonic acid,
- (XIII) L-glutamic acid, 3 $\beta$ -sulfate,
- (XIV) L-glutamic acid, 4 $\alpha$ -sulfonic acid,
- (XV) L-glutamic acid, 4 $\alpha$ -sulfate,
- (XVI) L-glutamic acid, 4 $\beta$ -sulfonic acid,
- (XVII) L-glutamic acid, 4 $\beta$ -sulfate,
- (XVIII) D-glutamic acid, N-sulfonic acid,
- (XIX) 2 $\beta$ , 4-dicarboxy, butane-1-sulfonic acid,
- (XX) 2 $\beta$ , 4-dicarboxy, butane-1-sulfate,
- (XXI) D-glutamic acid, 2 $\alpha$ -sulfonic acid,
- (XXII) D-glutamic acid, 2 $\alpha$ -sulfate,
- (XXIII) D-glutamic acid, 3 $\alpha$ -sulfonic acid,
- (XXIV) D-glutamic acid, 3 $\alpha$ -sulfate,
- (XXV) D-glutamic acid, 3 $\beta$ -sulfonic acid,
- (XXVI) D-glutamic acid, 3 $\beta$ -sulfate,
- (XXVII) D-glutamic acid, 4 $\alpha$ -sulfonic acid,
- (XXVIII) D-glutamic acid, 4 $\alpha$ -sulfate,
- (XXIX) D-glutamic acid, 4 $\beta$ -sulfonic acid,
- (XXX) D-glutamic acid, 4 $\beta$ -sulfate,
- (XXXI) L-glutamine, N-sulfonic acid,
- (XXXII) L-glutamine, 2 $\beta$ -sulfonic acid,
- (XXXIII) L-glutamine, 2 $\beta$ -sulfate,
- (XXXIV) L-glutamine, 3 $\alpha$ -sulfonic acid,
- (XXXV) L-glutamine, 3 $\alpha$ -sulfate,
- (XXXVI) L-glutamine, 3 $\beta$ -sulfonic acid,

- (XXXVII) L-glutamine, 3 $\beta$ -sulfate,
- (XXXVIII) L-glutamine, 4 $\alpha$ -sulfonic acid,
- (XXXIX) L-glutamine, 4 $\alpha$ -sulfate,
- (XL) L-glutamine, 4 $\beta$ -sulfonic acid,
- (XLI) L-glutamine, 4 $\beta$ -sulfate,
- (XLII) 2 $\alpha$ -carboxy, 4-carboxamido, butane-1-sulfonic acid,
- (XLIII) 2 $\alpha$ -carboxy, 4-carboxamido, butane-1-sulfate,
- (XLIV) 1 $\alpha$ -carboxy, 3-carboxamido, propane-1-sulfonic acid,
- (XLV) 1 $\alpha$ -carboxy, 3-carboxamido, propane-1-sulfate,
- (XLVI) 1 $\beta$ -carboxy, 3-carboxamido, propane-1-sulfate,
- (XLVII) 1 $\beta$ -carboxy, 3-carboxamido, propane-1-sulfonic acid,
- (XLVIII) D-glutamine, N-sulfonic acid,
- (XLIX) 2 $\beta$ -carboxy, 4-carboxamido, butane-1-sulfonic acid,
- (L) 2 $\beta$ -carboxy, 4-carboxamido, butane-1-sulfate,
- (LI) D-glutamine, 2 $\alpha$ -sulfonic acid,
- (LII) D-glutamine, 2 $\alpha$ -sulfate,
- (LIII) D-glutamine, 3 $\alpha$ -sulfonic acid,
- (LIV) D-glutamine, 3 $\alpha$ -sulfate,
- (LV) D-glutamine, 3 $\beta$ -sulfonic acid,
- (LVI) D-glutamine, 3 $\beta$ -sulfate,
- (LVII) D-glutamine, 4 $\alpha$ -sulfonic acid,
- (LVIII) D-glutamine, 4 $\alpha$ -sulfate,
- (LIX) D-glutamine, 4 $\beta$ -sulfonic acid,
- (LX) D-glutamine, 4 $\beta$ -sulfate.

14. (Withdrawn) The method according to claim 11, wherein the compound is selected from the group consisting of:

- (I) L-homoglutamic acid, N-sulfonic acid,
- (II) Pentane-2 $\alpha$ , 5-dicarboxy-1-sulfonic acid,
- (III) Pentane-2 $\alpha$ , 5-dicarboxy-1-sulfate,
- (IV) Butane-1 $\alpha$ , 4-dicarboxy-1-sulfonic acid,

- (V) Butane-1 $\alpha$ , 4-dicarboxy-1-sulfate,
- (VI) L-homoglutamic acid, 2 $\beta$ -sulfonic acid,
- (VII) L-homoglutamic acid, 2 $\beta$ -sulfate,
- (VIII) L-homoglutamic acid, 3 $\alpha$ -sulfonic acid,
- (IX) L-homoglutamic acid, 3 $\alpha$ -sulfate,
- (X) L-homoglutamic acid, 3 $\beta$ -sulfonic acid,
- (XI) L-homoglutamic acid, 3 $\beta$ -sulfate,
- (XII) L-homoglutamic acid, 4 $\alpha$ -sulfonic acid,
- (XIII) L-homoglutamic acid, 4 $\alpha$ -sulfate,
- (XIV) L-homoglutamic acid, 4 $\beta$ -sulfonic acid,
- (XV) L-homoglutamic acid, 4 $\beta$ -sulfate,
- (XVI) L-homoglutamic acid, 5 $\alpha$ -sulfonic acid,
- (XVII) L-homoglutamic acid, 5 $\alpha$ -sulfate,
- (XVIII) L-homoglutamic acid, 5 $\beta$ -sulfonic acid,
- (XIX) L-homoglutamic acid, 5 $\beta$ -sulfate,
- (XX) D-homoglutamic acid, N-sulfonic acid,
- (XXI) Pentane-2 $\beta$ , 5-dicarboxy-1-sulfonic acid,
- (XXII) Pentane-2 $\beta$ , 5-dicarboxy-1-sulfate,
- (XXIII) Butane-1 $\beta$ , 4-dicarboxy-1-sulfonic acid,
- (XXIV) Butane-1 $\beta$ , 4-dicarboxy-1-sulfate,
- (XXV) D-homoglutamic acid, 2 $\alpha$ -sulfonic acid,
- (XXVI) D-homoglutamic acid, 2 $\alpha$ -sulfate,
- (XXVII) D-homoglutamic acid, 3 $\alpha$ -sulfonic acid,
- (XXVIII) D-homoglutamic acid, 3 $\alpha$ -sulfate,
- (XXIX) D-homoglutamic acid, 3 $\beta$ -sulfonic acid,
- (XXX) D-homoglutamic acid, 3 $\beta$ -sulfate,
- (XXXI) D-homoglutamic acid, 4 $\alpha$ -sulfonic acid,
- (XXXII) D-homoglutamic acid, 4 $\alpha$ -sulfate,
- (XXXIII) D-homoglutamic acid, 4 $\beta$ -sulfonic acid,
- (XXXIV) D-homoglutamic acid, 4 $\beta$ -sulfate,

- (XXXV) D-homoglutamic acid, 5 $\alpha$ -sulfonic acid,
- (XXXVI) D-homoglutamic acid, 5 $\alpha$ -sulfate,
- (XXXVII) D-homoglutamic acid, 5 $\beta$ -sulfonic acid,
- (XXXVIII) D-homoglutamic acid, 5 $\beta$ -sulfate,
- (XXXIX) L-homoglutamine, N-sulfonic acid,
- (XL) Pentane-2 $\alpha$ -carboxy, 5-carboxamido-1-sulfonic acid,
- (XLI) Pentane-2 $\alpha$ -carboxy, 5-carboxamido-1-sulfate,
- (XLII) Butane-1 $\alpha$ -carboxy, 4-carboxamido-1-sulfonic acid,
- (XLIII) Butane-1 $\alpha$ -carboxy, 4-carboxamido-1-sulfate,
- (XLIV) L-homoglutamine, 2 $\beta$ -sulfonic acid,
- (XLV) L-homoglutamine, 2 $\beta$ -sulfate,
- (XLVI) L-homoglutamine, 3 $\alpha$ -sulfonic acid,
- (XLVII) L-homoglutamine, 3 $\alpha$ -sulfate,
- (XLVIII) L-homoglutamine, 3 $\beta$ -sulfonic acid,
- (XLIX) L-homoglutamine, 3 $\beta$ -sulfate,
- (L) L-homoglutamine, 4 $\alpha$ -sulfonic acid,
- (LI) L-homoglutamine, 4 $\alpha$ -sulfate,
- (LII) L-homoglutamine, 4 $\beta$ -sulfonic acid,
- (LIII) L-homoglutamine, 4 $\beta$ -sulfate,
- (LIV) L-homoglutamine, 5 $\alpha$ -sulfonic acid,
- (LV) L-homoglutamine, 5 $\alpha$ -sulfate,
- (LVI) L-homoglutamine, 5 $\beta$ -sulfonic acid,
- (LVII) L-homoglutamine, 5 $\beta$ -sulfate,
- (LVIII) D-homoglutamine, N-sulfonic acid,
- (LIX) Pentane-2 $\beta$ -carboxy, 5-carboxamido-1-sulfonic acid,
- (LX) Pentane-2 $\beta$ -carboxy, 5-carboxamido-1-sulfate,
- (LXI) Butane-1  $\beta$  -carboxy, 4-carboxamido-1-sulfonic acid,
- (LXII) Butane-1  $\beta$  -carboxy, 4-carboxamido-1-sulfate,
- (LXIII) D-homoglutamine, 2 $\alpha$ -sulfonic acid,
- (LXIV) D-homoglutamine, 2 $\alpha$ -sulfate,



- (LXV) D-homoglutamine, 3 $\alpha$ -sulfonic acid,
- (LXVI) D-homoglutamine, 3 $\alpha$ -sulfate,
- (LXVII) D-homoglutamine, 3 $\beta$ -sulfonic acid,
- (LXVIII) D-homoglutamine, 3 $\beta$ -sulfate,
- (LXIX) D-homoglutamine, 4 $\alpha$ -sulfonic acid,
- (LXX) D-homoglutamine, 4 $\alpha$ -sulfate,
- (LXXI) D-homoglutamine, 4 $\beta$ -sulfonic acid,
- (LXXII) D-homoglutamine, 4 $\beta$ -sulfate,
- (LXXIII) D-homoglutamine, 5 $\alpha$ -sulfonic acid,
- (LXXIV) D-homoglutamine, 5 $\alpha$ -sulfate,
- (LXXV) D-homoglutamine, 5 $\beta$ -sulfonic acid,
- (LXXVI) D-homoglutamine, 5 $\beta$ -sulfate.

Claims 15-28. (Cancelled)